

REMARKS

Reconsideration of the instant application is respectfully requested. The present amendment is responsive to the Office Action of May 22, 2003, in which claims 1-26 are presently pending. Of those, claims 1, 2, 5-7, 10, 11, 13, 16-18, 21-23 and 26 have been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent 6,441,615 to Fujita, et al. In addition, claims 3, 4, 8, 9, 14, 15, 19, 20, 24 and 25 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Fujita, in view of U.S. Patent 6,448,774 to Heid. Finally, claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Fujita, in view of U.S. Patent 6,448,774 to Heid. For the following reasons, however, it is respectfully submitted that the application is now in condition for allowance.

As an initial matter, the Examiner has stated that the title of the invention is not descriptive and has required a new title for the specification that is "clearly indicative of the invention to which the claims are directed." However, the Applicants respectfully traverse this requirement for the reason that the title "MULTIPLE CHANNEL, CARDIAC ARRAY FOR SENSITIVITY ENCODING IN MAGNETIC RESONANCE IMAGING" is in fact descriptive and indicative of the invention to which the claims are directed. This is reflected, for example, by the preamble of claim 1, which recites a "multiple channel array coil for magnetic resonance imaging".

In the alternative, the Applicants respectfully request the Examiner provide the Applicants with a suggested new title.

With regard to the rejections based on the art of record, independent claims 1, 6, 11, 17 and 22 have been amended to recite that "...each of said superior coil elements are arranged with an associated one of said inferior coil elements in an overlapping configuration, *and each of said left portions are arranged with an associated one of*



*said right portions in an underlapping configuration...*" (Emphasis added) As is explained in paragraph [0026], page 8 of the specification:

"However, it will be appreciated that additional design constraints further dictate that each individual coil within an array be decoupled from their neighbors so that noise is uncorrelated. Generally, conventional coils with overlap decoupling tend to produce higher geometry-related noise enhancement and thus are not suited for SENSE imaging. Accordingly, other decoupling methods may be implemented. On the other hand, an underlap (non-overlap) of coils along a particular direction may result in a lack of signal detected in a plane perpendicular thereto. More specifically, it has been discovered that an underlap in the z-direction results in the absence of a signal in the xy-plane, while an underlap in either the x or y-directions does not cause an absence of signal in the corresponding planes. This is because the net magnetization vector rotates around the z-axis at all times."

Accordingly, the 8-channel coil of the present disclosure (as is now more specifically pointed out in the claims) provides that the superior/inferior coils are arranged in an overlapping configuration while, at the same time, the left/right portions are arranged in an underlapping (i.e., non-overlapping or spaced apart) configuration, as is shown in Figures 2 and 4. This specific coil design is particularly suited for SENSE imaging.

In contrast, a review of the Fujita reference reveals that there is no combination of an underlapping as between left/right portions, with an overlapping of superior/inferior coils. As can be seen most particularly in Figure 4 of Fujita, the ladder coils 100<sub>1</sub> through 100<sub>8</sub> are all either overlapping or directly adjacent with respect to one another. In other words, there is no teaching of underlapping of left/right coil portions. Accordingly, since this claim element is not found in Fujita or any of the other references of record, the obviousness rejections to each of the remaining pending claims have been overcome, and it is respectfully requested that the same be withdrawn.



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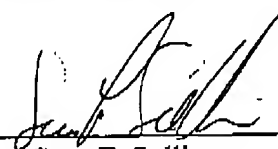
Finally, claims 2, 7, 13, 18 and 23 have been canceled as being rendered superfluous in view of the amendments to the independent claims. Claims 3, 8, 14, 19 and 24 have been amended to change their dependencies from the now canceled claims to the corresponding independent claims.

For the above stated reasons, it is respectfully submitted that the present application is now in condition for allowance. No new matter has been entered and no additional fees are believed to be required. However, if any fees are due with respect to this Amendment, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,  
JULIA HELENA ANNA KLINGE, ET AL.

CANTOR COLBURN LLP  
Applicants' Attorneys

By



Sean F. Sullivan  
Registration No. 38,328  
Customer No. 23413

Date: August 21, 2003  
Address: 55 Griffin Road South, Bloomfield, CT 06002  
Telephone: (860) 286-2929